



**Queensland University of Technology**  
Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

[Waha, Barbara & Davis, Kate](#)  
(2014)

University students' perspective on blended learning.

*Journal of Higher Education Policy and Management*, 36(2), pp. 172-182.

This file was downloaded from: <http://eprints.qut.edu.au/65887/>

**© Copyright 2014 Association for Tertiary Education Management and the LH Martin Institute for Tertiary Education Leadership and Management**

The Version of Record of this manuscript has been published and is available in *Journal of Higher Education Policy and Management*, 14 March 2014, <http://www.tandfonline.com/10.1080/1360080X.2014.884677>

**Notice:** *Changes introduced as a result of publishing processes such as copy-editing and formatting may not be reflected in this document. For a definitive version of this work, please refer to the published source:*

<http://doi.org/10.1080/1360080X.2014.884677>

# University students' perspective on blended learning

---

Barbara Waha and Kate Davis

bawa1303@gmail.com, k3.davis@qut.edu.au

Information Systems School | Science and Engineering Faculty | Queensland University of Technology

## **Abstract**

This research project aimed to explore students' perspective on an appropriate mix of online and face-to-face activities in a master's programme in library and information science at an Australian university. Identifying aspects that students evaluate as supportive, challenging and efficient in their learning is important for the design of an appropriate mix in blended learning courses. Twenty-three master's students responded to a questionnaire containing 40 open-ended and closed questions. Applying both statistical and content analysis provides a deeper understanding of students' responses. Students like the flexibility and the convenience of online learning, but also the possibilities of face-to-face interaction with teachers and peers for building personal learning networks. Students expect an equal quality of learning delivery and criticised the quality of online participation and lecture recordings. Blended learning is an approach that supports a range of learning styles and life styles.

## **Keywords:**

Blended learning, learning delivery, design, students' perception, students' experience, students' motivation

## **Introduction**

Higher education institutions have long recognised that holding onto past learning and teaching practices is not congruent with the needs of our knowledge society. Universities have been challenged to position their institutions for the 21<sup>st</sup> century. This is not simply about applying new software or developing online learning modules, but rather it is about assisting learners to take advantage of web technology and community resources and to facilitate increasingly effective learning strategies (Hwang, Hsu, Tretiakov, Chou & Lee, 2009). Teaching and learning literature reports a discrepancy between students' preferences for flexibility and unsatisfactory experiences that can arise from engaging in a mode of study that provides flexibility through the inclusion of synchronous and asynchronous online components. Loneliness and isolation, lack of motivation, poor communication, fear of online

communication, and lack of guidance by teachers are reported as issues in online learning (Hanisch, Carroll, Combes & Millington, 2011). The literature provides some insight into a number of questions related to a successful blend. What is the right blend? How much face-to-face interaction and how much online interaction? What specific learning strategies and approaches should be used and in what proportions?

The authors sought to explore these questions by asking students about their experience of blended learning in the Master of Information Technology (Library and Information Studies) (MIT(LIS)) at the Queensland University of Technology, in Australia. In this programme, all students – both internal and external – have equal access to all online tools and materials, as well as the option of attending face-to-face activities. Students can mix the activities and tools to suit their needs.

## **Aim**

This study aimed to investigate students' expectations, perceptions of and satisfaction with the blended, flexible delivery of the MIT (LIS). The study was designed to allow the teaching staff to better understand of what students need and what they want, including in what proportion or to what extent. The expectation was that the findings of this study would contribute to the development of a blended learning framework for the degree.

The main objectives of this study were to:

1. explore students' expectations and perceptions of, and experience with the blended learning approach,
2. explore which aspects of in the blended learning mode students enjoy and which they find useful, and
3. discover the role of communication and collaboration in the blended learning mode.

## **Literature review**

A review of the literature revealed gaps related to students' experience of blended learning. For the purposes of this study, blended learning is defined as the integration of useful aspects of online and face-to-face learning environments, where students and teacher interact both with and without the use of technology (Garrison & Vaughan, 2008; Tselios, Daskalakis & Papadopoulou, 2011). Blended learning is an approach that combines different delivery methods – online and face-to-face – and caters to different styles of learning (Wu, Tennyson

and Hsia, 2010). The 'blend' can involve use of any form of instructional technology in combination with classroom teaching. Tselios et al. (2011) argued that 'blended learning provides the opportunity to integrate advantages offered by online learning with the best practice and benefits of traditional learning' (p. 225). Blended learning is more than a simple integration of new information and communication technologies with face-to-face activities (De George-Walker & Keeffe, 2010). Effective blended learning plays on the strengths of face-to-face and online learning and combines the best of both approaches to facilitate the best learning outcomes for students (Vaughan & Garrison, 2005). It is an 'organic integration of thoughtfully selected and complementary face-to-face and online approaches and technologies' (Garrison & Vaughan, 2008, p. 148).

The literature reports particular aspects of blended learning that students enjoy, including flexibility in terms of scheduling, online interaction, and the teachers' availability (El Mansour & Mupinga, 2007). Students appreciate the higher quality and quantity of interaction with teachers and peers that blended learning can facilitate (Garrison & Vaughan, 2008). The almost round-the-clock online availability of teachers and students on one hand, and the physical presence of the teacher for work guidance and interaction on the other hand, are found to be beneficial (Pinto de Moura, 2010).

The blended learning mode can bridge the gap between students and their teachers, as well as students and their peers (Li-Ling, 2011). Effective blended learning can facilitate the development of a learning community, which promotes interaction between teachers and students and facilitates students' enjoyment of learning experiences (Qiuyun, 2008). This is supported by Garrison and Kanuka (2004, p. 174) highlighting the advantages of blended learning in 'creating a better sense of community without sacrificing high academic standards'. Other studies have revealed that blended learning can have a positive impact not just on student experience, but also on performance. Blended learning can result in improved results and reduced dropout rates (Lopez-Perez, Perez-Lopez & Rodriguez-Ariza, 2011).

The literature also reports a downside of blended approaches from the student perspective. Students feel lost and this has an impact on their experience (El Mansour & Mupinga, 2007; Eshet-Alkalai, 2004). In the online environment, students do not 'feel as a part of the class' and 'lose the personal teacher student relationship' (El Mansour & Mupinga, 2007, pg.247)..

Another aspect is students' and teachers' lack of the requisite skills in using technology effectively (Eshet- Alkalai, 2004; Shemla, & Nachmias, 2007). Spencer (2006) specified this by stating that reading in digital format might not be beneficial for students' achievement. The literature reveals that students enjoy the flexibility that blended learning can provide and that they benefited from the opportunity of engaging in both online and face-to-face interactions. However, the range of contradictory reports in recent literature on the potential of different blended learning models shows the need for more research on specific blended learning programmes in order to establish proper standards for effective programme design and implementation (Preceel, Yoram & Yael, 2009).

In the case of the MIT(LIS), where online and face-to-face cohorts are taught simultaneously, learning design is more complex. In this context, the 'blend' is not just about use of traditional and technology-assisted teaching practices, but also about the mix of synchronous and asynchronous learning experiences. In the early days of offering the programme externally, online students were simply provided with recordings of face-to-face classes. However, teaching staff quickly realised it is not enough to format-shift face-to-face classes into the online environment, an idea that is supported by Verkroost, Meijerink, Lintsen & Veen (2008). Approaches to teaching must be rethought for the online environment. Online environments provide a level of flexibility that cannot be found in a classroom environment, while face-to-face interaction provides the social interaction that is important for learning (Akkoyunlu & Soyly, 2008).

## **Methodology**

Twenty-three students from a cohort of 70 students enrolled in the MIT (LIS) responded to an online survey towards the end of 2011. Participants were enrolled as full-time or part-time students (of a duration of 18 months and three years respectively). The course includes ten core and two elective units. A self-administered online questionnaire was used to collect data from students who were geographically widely spread. It also suited the scope of the study, as the project had to be conducted within a finite amount of time (approximately four months), by a solo researcher (with supervisor support). Questionnaires are a common research instrument in studies of students' perspectives on blended learning (Akkoyunlu & Soyly, 2008; Kember, McNaught, Chong, Lam & Cheng, 2010; Blankson & Kyei-Blankson, 2008). The questionnaire contained 40 open- and closed-ended questions that were used to collect

both quantitative and qualitative data. Students' responses to closed questions based on a Likert-type scale provided information about the frequency, effectiveness and enjoyment of learning tools' and resources' usage. Students also had the opportunity to respond in their own words to a majority of the questions, providing a better understanding of their feelings, motivations and satisfaction in regard of the programme.

Statistical analysis and content analysis were applied to quantitative and qualitative data respectively. Content analysis applying the inductive approach was used to analyse data from students' responses to open-end questions and students' comments at the end of each closed question.

While the study yielded rich data about student experiences, the number of participants is too small to make a significant statistical claim and to generalise the findings for other higher education courses or institutions. The questionnaire is not necessarily the best instrument for obtaining qualitative data or exploring lived experience, however, open-ended questions gave participants the opportunity to respond in their own words, balancing the need for qualitative data with resourcing and time constraints.

## **Results and discussion**

The results are presented as an overview in Appendix 1.

Students were asked about their preferences for a particular mode of study (online or face-to-face) and about half of participants indicated they prefer a fully online study mode. Of those students, two-thirds favoured asynchronous online learning exclusively, indicating they wished to engage with the material at a time that suits them best rather than at a specific time and date. Flexibility, convenience and independence are characteristics of online learning that students indicated they value. Participants enjoyed the advantages of having permanent online access to materials.

A third of the participants indicated they prefer the face-to-face study mode. One student commented that frequent meetings with peers and teachers in class supported the development of a strong personal learning network. Students expressed that they prefer to ask their question directly to the teacher in the class. Two students mentioned that being on campus is good for engaging with peers and teachers. Lack of self-motivation was given as a

reason for face- to-face learning by another student, explaining that there was an enforcement to do the work at class time on campus and that real time interaction assisted with students learning.

Seventeen per cent of respondents indicated that they prefer the blended mode. These students found the mix of face-to-face and online mode is beneficial for learning. One student stated that the flexibility is helpful as it allows study to be fitted in around other commitments including work and study, while still providing opportunities to engage with peers in synchronous activities when possible. Another responded ‘I like the ability to not to go to class, if for some reason I can’t make it, but still find information online to compensate for that. I like [the fact] that I don’t have to travel into the city all the time to complete my course’. On the whole, students with a preference for the blended mode value the freedom of choice in regard to ways of learning. The most common factors that cause students to prefer a blended mode are flexibility, convenience, interaction with peers and teachers, interaction, independence, and balancing work commitments.

Students were asked to indicate which of the methods and tools commonly used in the course aid their learning, and which they enjoy using. As shown in Table 1, students may enjoy a particular method or tool, but not find it particularly beneficial; and similarly, they may find tools aid their learning, but not enjoy using them.

Table 1 Students’ experience with tools

<b>Statement ‘strongly agree’ and ‘agree’ about experience with unit material as a percentage of participants</b>			
<b>Material</b>	<b>Aides my learning</b>	<b>Enjoy it</b>	<b>No enjoyment</b>
<b>Short videos</b>	<b>87%</b>	<b>91%</b>	<b>0%</b>
<b>Instructional screencasts</b>	<b>91%</b>	<b>87%</b>	<b>0%</b>
<b>Audio recording of lectures</b>	<b>74%</b>	<b>48%</b>	<b>17%</b>
<b>Video recording of lectures/tutorials</b>	<b>65%</b>	<b>57%</b>	<b>13%</b>
<b>PowerPoint download</b>	<b>82%</b>	<b>65%</b>	<b>13%</b>
<b>Participation in Elluminate* class</b>	<b>61%</b>	<b>52%</b>	<b>17%</b>
<b>Recommended reading</b>	<b>91%</b>	<b>69%</b>	<b>4%</b>

Unit announcements	82%	69%	4%
--------------------	-----	-----	----

\*Elluminate is a virtual classroom application that allows students to attend live online classes.

Students reported that short videos and screencasts were the most enjoyable (enjoyed by 91 per cent and 87 per cent of students respectively) and the majority reported that these aided their learning (87 per cent and 91 per cent respectively). Students reported short videos and screencasts were quick and easy to engage with and could be accessed in a variety of ways. One student stated that these kinds of tools make learning more valuable and support students with a preference for visual learning. It reflected the value students place on convenience, flexibility and the ability to use materials whenever and how often they want. The preference for short videos and instructional screencasts indicates a preference for short, concise learning materials, and idea that was supported by student comments.

Three quarters of students indicated they found audio recordings of face-to-face lectures aide their learning, but less than half of respondents reported enjoyment of this format of material. Similarly, only 57 per cent of respondents indicated they enjoyed using video recordings of face-to-face classes (although 65 per cent of students reported they aided their learning), indicating a low level of satisfaction with format shifting face-to-face classes. Reasons for this included technical issues like recording failures and poor recordings.

Elluminate was the topic of many participants' comments. This tool is a virtual classroom application that allows students to attend live online classes. Students can participate live in Elluminate classes or watch a recording afterwards. Elluminate allows participants to interact using audio, video and text chat. Lecture slides are loaded onto a whiteboard for students to view as the lecturer speaks. It also provides opportunities for discussion and has additional features that support various activities, including screen sharing and web tours. Students can attend the Elluminate class from any location using their own computer. To participate, students need a robust internet connection and, if they wish to speak rather than type, a microphone. Recordings are available as streamed files from Blackboard and can be exported for download.

Sixty-one per cent of participants found Elluminate classes beneficial. Just as students find recordings of on campus classes useful, they value being able to revisit the recorded Elluminate lecture at a time that suits them, with sixty-five per cent reporting that Elluminate recordings aide their learning and seventy per cent indicating they are an effective tool for



engaging with the unit content. Unsurprisingly, frequency of use correlated with the degree to which the students found Elluminate sessions and recordings useful. Students stated that they use the Elluminate recordings with slightly more frequency than the live sessions.

Students' comments revealed frustration with technical issues experienced when using Elluminate, citing problems with audio input and output, the need for a robust internet connection to ensure a positive experience, and functionality that does not work as well as it could. One student stated "I really don't like Elluminate but perhaps it's just the program, not the way of interacting that I don't like", indicating frustration with the tool, rather than disinterest in attending synchronous online classes. Only 52 per cent of students indicated they enjoy using Elluminate, which demonstrates significant room for improvement. It should be noted that since this research was conducted, Elluminate has been upgraded and rebranded. Its replacement, Blackboard Collaborate, is significantly more stable and the experience of online classes has changed dramatically.

Although most learning tools provided in the course were highly accepted, there were exceptions (see Appendix 1). In addition to Elluminate classes and lecture recordings, other tools that were not well accepted were Blackboard wikis and Blackboard discussions. Blackboard wikis allow students and teachers to co-create, edit and share content, while Blackboard discussions are traditional forums that allow students to post comments and questions in threaded discussions).

In addition to addressing effectiveness and enjoyment of learning tools, this study also explored methods of interacting with peers and teaching staff. Teaching staff offer students a variety of ways to interact with them and are contactable across multiple channels, including email, Skype (a VoIP tool that allows text chat, audio and video calls) and social media tools such as Twitter. Skype is used to facilitate consultations because it allows students and teachers to connect with each other using video and to share their screens, making it an excellent tool to for working through assignment questions. In the MIT(LIS), Twitter is used to facilitate group conversations, interaction between teacher and students, and interaction among the cohort. Class lists are created so that students can follow their peers simply by following a list, rather than adding each student individually. Hash tags (a combination of characters led by a hash symbol) using the unit code for each class (for example, #inn333) are used to group conversations relevant to the class.

When asked about effectiveness of tools for interaction with teachers, 91 per cent of participants indicated email as an effective tool – more than for any other medium. Given the variety of communication tools available – and the immediacy offered by some of those tools – it is surprising that students favoured email communication. Respondents noted the teachers respond quickly to student emails and that this was seen as helpful. Robinson (2011) presented similar findings of students’ preference for email as a communication tool. This result confirms that if a tool is highly utilised and the teacher is always available through this tool, students are highly motivated and satisfied in using it.

The majority of participants indicated personal interaction with peers and teachers for sharing information and collaboration is an important part of their study. Seventy-eight per cent found that attending face-to-face classes was an effective way of engaging with the teacher. Similarly, attending face-to-face classes was reported as an effective way of communicating and interacting with peers by more respondents than for any other medium. As one student stated, face-to-face interaction helps build relationships. It is notable that even students who prefer the online study mode indicated that face-to-face participation is effective in terms of facilitating interaction with teachers and their peers.

Seventy per cent of participants found social media to be an effective way to interact with peers and 64 per cent found it effective to communicate with teachers. One student pointed out that the effectiveness of a tool for communicating with peers is dependent on having a large number of students and teachers using it. Another student stated that any learning enquiries are ‘personal’ and ‘should be discussed in a personal way’ with the teacher. Another student commented that traditional methods to communicate with the teacher are better as a “specific answer” is required. Twitter was reported as the most used channel for discussion with peers about the unit content and was valued for supporting students’ learning.

Students highlighted the learning in one particular unit (INN333: Information Programs) in which the unit site was built with a multisite installation of Wordpress. Wordpress is an open source content management system that is commonly used as a blogging platform. In this unit, the Wordpress installation was set up to allow students to create their own blogs within the class network. The main blog was authored by the teacher and all learning materials were available on the site. This site became the primary learning and communication platform for the unit, with blogs, groups and messaging functionality. In addition, Twitter content was fed

into the site. One student stated that ‘the blog set up in INN333 [was] the most effective channel’, and another student mentioned that this site was the ‘best way of interaction in my study experience to date’. Students valued the opportunity to get feedback as they completed learning activities. This example illustrates that if a tool is thoughtfully designed and mediated by the teacher, students are more likely to be highly motivated and satisfied to use it. Notably, students did not have the same experience of using the university’s learning management system, Blackboard, which was evaluated as effective for interacting with the teacher by only 43 per cent of participants. This further supports the idea that the traditional LMS and the functionality it offers does not provide an optimal learning experience.

As demonstrated by the previous example, teachers’ preference for, knowledge of, and engagement via particular communication tools – specifically, social media channels – is an important factor influencing the effectiveness of those tools. As two students stated, teachers’ preference for tools impacts the successful introduction and usage within a unit.. A few students suggested that teachers should choose only one communication channel for use in each unit, rather than combining different channels. One student expressed a high satisfaction with the way technology had been used in the course, but mentioned that problems arise if some students dominate channels with ‘rubbish’ or as another student stated, ‘clogged information’. Another student raised concerns by saying ‘sometimes it feels like more work than it’s worth, just trying to communicate with one person or group on multiple platforms’. One student found the application of many channels in a single unit overwhelming, while another indicated that social media tools are a good way to interact, but not suitable for discussing students’ personal matters related to their study (although it should be noted that students are encouraged to contact teaching staff privately about personal matters).

It is obvious from most students’ feedback that discussion with peers is a key factor for motivation and satisfaction in their course. These findings are contrary to Reisetter, LaPointe and Korcuska (2007) who concluded that the face-to-face learner group accentuated the learning community, whereas the online learners emphasised the individualist perspective. The ability to learn independently is valued by all participants too, but the majority of students highlighted the importance of building up a good relationship with teachers and peers. Students appreciate the benefit of an effective personal learning network, and are motivated to meet peers face-to-face (73%) and on Twitter (73%) as these are the most effective ways of collaborating for them. According to So (2009) and Diaz and Entonado

(2009), feeling connected increases students' motivation to engage in communication. Mackey and Ho (2006) asserted that teachers or face-to-face classes are not replaced by online tutorials, but that these are 'complementary resources to enhance other aspects of blended learning' (p. 407). However, the example of the INN333 course site tells us that online engagement is valued when it is well designed.

Most respondents felt motivated by collaborating in the learning community, however, collaboration on group assignments across the internal and external cohorts was reported as challenging. One student stated that working with peers enrolled in a different mode of study was a 'mismatch between learning styles', while another indicated that group assignments 'were a pain with people who refused to use online communication'. These comments indicate that student preferences for a particular mode of study may have an adverse impact on successful collaboration. Appendix 1 gives an overview of quantitative data to closed questions in the survey.

Figure 1 illustrates all adjectives participants have used in their feedback about the positive and negative aspects, expressing their attitudes, beliefs and feelings related to the blended learning mode. It is noticeable that students use a wide range of both positive and negative adjectives, but on the whole, the view is mostly positive. Flexibility and effectiveness are the most cited adjectives for the blended learning mode and the tools are used in this course.



Figure 1 Students' comments about blended learning course

When asked which tools they would like to see used in the future, most students focused on communication tools, reinforcing the importance of communication in an effective blended learning experience. Students indicated a desire for Twitter and blogs to be used more frequently, and cited the INN333 unit site as a platform they would like to see more of. Notably, although acceptance of Elluminate was fairly low and students did not particularly enjoy using it, students indicated a desire for it to be used more frequently.

Finally, students were asked to indicate whether they thought the blended mode was appropriate for their field of study. Eighty-five per cent of participants agreed that blended learning is an appropriate mode of study for their field (library and information studies). Despite a strong preference for internal study and only a 17 per cent preference for the blended mode, students were cognisant of the advantages of blended learning for their field of studies.

## **Conclusion**

The results of this study do not provide guidance on what the 'right blend' of online and face-to-face learning might be. Instead, the results indicate that the 'right blend' is different for each student, dependent on their learning style and circumstances. This finding is affirmed by the literature (see for example Akkoyunlu & Soylu, 2008). The 'right blend' also varies across different content areas, with different proportions of online and face-to-face learning being appropriate for different subjects.

Students' feedback from this survey provided new knowledge about their perspective on blended learning mode and aspects that drive students' motivation. The basically positive feedback and the expressed expectations of participants to keep the blended learning approach for the programme illustrate that the mix of online and face-to-face learning meets students' needs. Students' preference for individual and independent learning was found as an advantage in the blended mode. Both online as well as face-to-face students appreciate the flexibility of choosing between both learning environments in the programme. Identifying these preferences is important for the further improvement of the blended approach meeting students' different learning styles.

## Further Research

Qualitative research methods such as interviews or focus groups could be applied for future research to understand the complex of students' perspective on blended learning. This would allow exploration of factors that might enhance their engagement. Since this study was completed, teaching staff have trialled a 'flipped classroom' approach to blended learning, providing short videos for students to watch before class, and running simultaneous online and face-to-face classes in which undertake a range of activities that allow them to learn through doing. Future research will explore the effectiveness of this model.

## References

- Akkoyunlu, B., & Soyly, M. Y. (2008). A study of student's perceptions in a blended learning environment based on different learning styles. *Educational Technology & Society*, 11(1), 183-193.
- Blankson, J., & Kyei-Blankson, L. (2008). Nontraditional Students' Perception of a Blended Course: Integrating Synchronous Online Discussion and Face-to-Face Instruction. *Journal of Interactive Learning Research*, 19, 421-438.
- De George-Walker, L., & Keeffe, M. (2010). Self-determined blended learning: a case study of blended learning design. *Higher Education Research & Development*, 29, 1-13.
- Diaz, L. A., & Entonado, F. B. (2009). Are the Functions of Teachers in e-Learning and Face-to-Face Learning Environments Really Different? *Educational Technology & Society*, 12(4), 331-343.
- El Mansour, B., & Mupinga, D. M. (2007). Students' Positive and Negative Experiences in Hybrid and Online Classes. *College Student Journal*, 41, 242-248.
- Eshet-Alkalai, Y. (2004). Digital Literacy: A Conceptual Framework for Survival Skills in the Digital Era. *Journal of Educational Multimedia and Hypermedia*, 13, 93-106.
- Garrison, D. R., & Kanuka, H. (2004). Blended Learning: Uncovering Its Transformative Potential in Higher Education. *The Internet and Higher Education*, 7, 95-105.
- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: framework, principles, and guidelines*. San Francisco: Jossey-Bass.
- Hanisch, J. H., H.; Carroll, M.; Combes, B., & Millington, A. (2011). *Online LIS education: towards the right balance of flexibility and engagement*. Retrieved from <http://www.slideshare.net/RAILS7/online-lis-education-towards-the-right-balance-of-flexibility-and-engagement>

- Hwang, W.-Y., Hsu, J.-L., Tretiakov, A., Chou, H.-W., & Lee, C.-Y. (2009). Intra-action, interaction and outeraction in blended learning environments. *Educational Technology & Society*, 12(2), 222.
- Kember, D., McNaught, C., Chong, F. C. Y., Lam, P., & Cheng, K. F. (2010). Understanding the ways in which design features of educational websites impact upon student learning outcomes in blended learning environments. *Computers & Education*, 55(3), 1183-1192.
- Li-Ling, H. (2011). Blended learning in ethics education: a survey of nursing students. *Nursing Ethics*, 18(3), 418-430.
- Lopez-Perez, M. V., Perez-Lopez, M. C., & Rodriguez-Ariza, L. (2011). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education*, 56(3), 818-826.
- Mackey, T. P., & Ho, J. (2006). Exploring the relationships between Web usability and students' perceived learning in Web-based multimedia (WBMM) tutorials. *Computers & Education*, 50(1), 386-409.
- Pinto de Moura, A. (2010). Food consumer science post-graduate courses: comparison of face-to-face versus online delivery systems. *British Food Journal*, 112, 544-556. doi: 10.1108/00070701011043781
- Qiuyun, L. (2008). Student satisfactions in four mixed courses in elementary teacher education programme. *International Public Management Journal*, 11, 53.
- Precel, K., P., Yoram, E.-A., & Yael, A. (2009). Pedagogical and Design Aspects of a Blended Learning Course. *International Review of Research in Open and Distance Learning*, 10 (2), 173
- Reisetter, M., LaPointe L., & Korcuska, J. (2007). The Impact of Altered Realities: Implications of Online Delivery for Learners' Interactions, Expectations, and Learning Skills. *International Journal on E-Learning*, 6, 55-80.
- Robinson, J. (2011). Assessing the value of using an online discussion board for engaging students. *Journal of Hospitality Leisure Sport & Tourism Education*, 10, 13-22.
- Shemla, A., & Nachmias, R. (2007). Current State of Web-Supported Courses at Tel-Aviv University. *International Journal on E-Learning*, 6, 235-246.
- So, H. J. (2009). When groups decide to use asynchronous online discussions: collaborative learning and social presence under a voluntary participation structure. *Journal of Computer Assisted Learning*, 25, 143-160.
- Spencer, C. (2006). Research on Learners' Preferences for Reading from a Printed Text or from a Computer Screen. *Journal of Distance Education*, 21, 33-50.

- Tselios, N., Daskalakis, S., & Papadopoulou, M. (2011). Assessing the Acceptance of a Blended Learning University Course. *Educational Technology & Society*, 14(2), 224-235.
- Vaughan, N., & Garrison, D. R. (2005). Creating cognitive presence in a blended faculty development community. *The Internet and Higher Education*, 8, 1-12. doi: 10.1016/j.iheduc.2004.11.001
- Verkroost, M.-J., Meijerink, L., Lintsen, H., & Veen, W. (2008). Finding a Balance in Dimensions of Blended Learning. *International Journal on E-Learning*, 7, 499-522.
- Wu, J.-H., Tennyson, R.D., & Hsia, T.-L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 155-164.



## Appendix 1 Overview quantitative data

Tool / Percentage of participants	Support	Effectiveness			Frequency	Enjoyment	Extent	
Material	Aids my learning	for interaction with peers	for interaction with teacher	for encouragement with unit content	of usage as a part of learning	as a part of my study	usage to engage in discussion with peers about the unit content	Discussion with teacher about learning enquiries
Short videos	87%					91%		
Screencast	91%					87%		
Audio recording of lectures/Eluminate	74%			69%	61%	48%		
Video recording	65%					57%		
Power Point download	82%					65%		
Eluminate class	61%	57%	61%	56%	48%	52%	36%	41%
Recommended reading	91%					69%		
Unit announcement	82%					69%		
Blackboard discussion forum		31%	43%	35%	30%		23%	36%
Social media		65%	70%	65%	65%		63%	68%
Wikis		22%	17%	22%	9%		14%	18%
Student blogs		61%	57%	74%	48%			
Attending face to face class		74%	79%	74%	52%		73%	68%
Email		75%	91%	74%	78%			
Personal Network Learning (PLN)							73%	
Skype								36%

Students' feedback about particular tools in the blended learning course (the highest acceptance is highlighted).